Enabling Earth Science Research Through Use of Aura MLS Data with Outside Science Data Products

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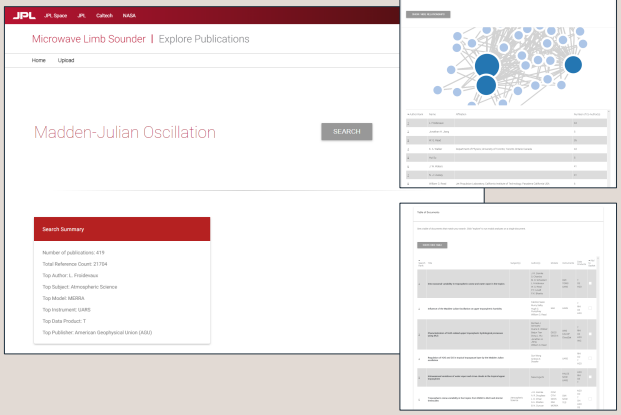
Aura MLS Publication Tool

The Aura Microwave Limb Sounder (MLS) instrument has produced nearly 15 years' worth of atmospheric science data. This data is publicly available through the Goddard Earth Science Data and Information Services Center (GES-DISC). While on its own it can reveal the workings of multiple physical processes that occur in the Earth's atmosphere, MLS data is often used with data from other instruments to answer complex research questions. Studies using multi-instrument data can also help assess and validate atmospheric models and many data products are typically used together.

Over the last decade, the 22 MLS Level 2 data products have been used in over 900 publications. To mine these publications for information on associations that might normally be overlooked, we have developed an new publication exploration tool.

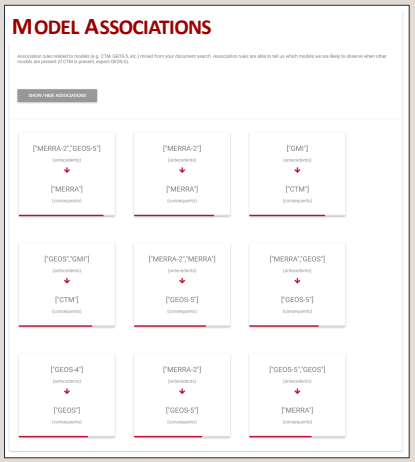
Full Text Publication Search



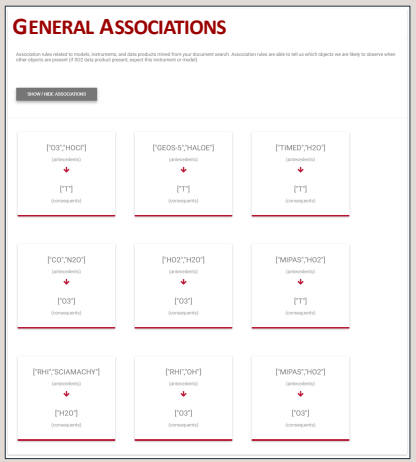
By uploading the full text of MLS-related publications to a new tool we have developed, we can mine the text and then search for science topics. We can also identify relationships and usage patterns among the data – specifically with regards to which data sets are used together[1], which researchers publish together[2], and what research topics are being investigated.

Data Association

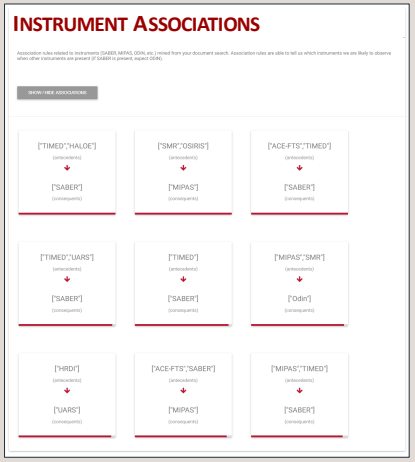
Model Associations



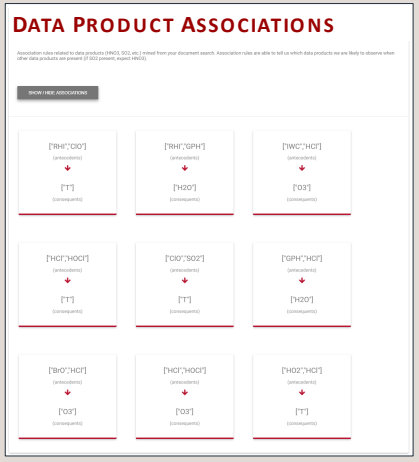
General Associations



Instrument Associations



Data Product Associations



Applying Natural Language Processing (NLP) techniques jointly with analytical approaches like pattern mining allows us to examine associations in MLS data product use in key research topics. We can also draw more specific inferences about which Aura MLS data products are used with other science data products.

References

1. Rakesh Argawal, Ramakrishnan Srikant. Fast Algorithms for mining association rules. Proceedings of the 20th International Conference on VLDB. (1994) 487-499.
2. Xiaming Liu, Johan Bollen, Michael L. Nelson, Herbert Van de Sompel. Co-authorship networks in the digital library research community. Information Processing and Management. 41 (2005) 1462-1480.